C1

Number and language

CHAPTER ASSIGNMENT · 66 MARKS

Name _____ Class _____ No. _____ Date _____

Answer every question in the space given. Do not use a calculator unless a question says you may. Show your working. A decimal written with ... repeats for ever: 0.7373... means 0.737373...

Practice questions from *Cambridge IGCSE Mathematics Core and Extended* (4th edition), Chapter 1 (Number and language), for classroom use. Questions that used a diagram in the book describe it in words. The Check yourself and Chapter quiz questions are Guru Jazzy's own.

Exercise 1.1 · Primes and reciprocals

1.1.1 In a 10 by 10 square, write the numbers 1 to 100. Cross out 1. Cross out every even number after 2, every third number after 3, then the multiples of 5 and 7. List all the prime numbers less than 100. [3]

1.1.2 Write the reciprocal of each number.

1/8	7/12	3/5	1½	3¾	6

Exercises 1.2 to 1.4 · Factors and prime factors

1.2 List all the factors of each number.

Number	Factors	Number	Factors
6		36	
9		35	
7		25	
15		42	
24		100	

1.3 List the prime factors of each number.

15	18	24	16	20	13	33	35	70	56

1.4 Write each number as a product of prime numbers, using powers where you can. For example, $24 = 2^3 \times 3$.

Number	Product of primes	Number	Product of primes
12		56	
32		45	
36		39	
40		231	
44		63	

Exercise 1.5 · HCF and LCM

1.5.1 Find the HCF of these numbers.

Numbers	HCF	Numbers	HCF
8, 12		22, 110	
10, 25		32, 56, 72	
12, 18, 24		39, 52	
15, 21, 27		34, 51, 68	
36, 63, 108		60, 144	

1.5.2 Find the LCM of these numbers.

Numbers	LCM	Numbers	LCM
6, 14		3, 5, 7	
4, 15		4, 5, 10	

Numbers	LCM	Numbers	LCM
2, 7, 10		3, 7, 11	
3, 9, 10		6, 10, 16	
6, 8, 20		25, 40, 100	

Exercise 1.6 · Rational and irrational numbers

1.6.1 State whether each number is rational or irrational.

1.3	0.666…	$\sqrt{3}$	$-2\frac{3}{5}$	$\sqrt{25}$	$\sqrt[3]{8}$	$\sqrt{7}$	0.625	0.1111…

1.6.2 State whether each number is rational or irrational.

$\sqrt{2} \times \sqrt{3}$	$\sqrt{2} + \sqrt{3}$	$(\sqrt{2} \times \sqrt{3})^2$	$\sqrt{8} \div \sqrt{2}$	$2\sqrt{5} \div \sqrt{20}$	$4 + (\sqrt{9} - 4)$

1.6.3 Decide whether each quantity is rational or irrational. Give a reason for each answer.

(a) The length of the diagonal of a rectangle 3 cm by 4 cm. **[2]**

(b) The circumference of a circle of diameter 4 cm. **[2]**

(c) The side length of a square of area 72 cm^2. **[2]**

(d) The area of a circle of radius $1/\sqrt{\pi}$. **[2]**

Exercises 1.7 to 1.9 · Square roots and cube roots

1.7 Find each square root without a calculator, then check on your calculator.

√25	√9	√49	√100	√121	√169	√0.01	√0.04	√0.09	√0.25

1.7.3 Calculate.

√(1/9)	√(1/16)	√(1/25)	√(1/49)	√(1/100)	√(4/9)	√(9/100)	√(49/81)	√(2 7/9)	√(6 1/4)

1.8 Copy and complete the table for $y = \sqrt{x}$, then plot the graph of $y = \sqrt{x}$ on graph paper. [4]

x	0	1	4	9	16	25	36	49	64	81	100
y											

Use your graph to estimate √35, √45, √55, √60 and √2. Check them with the √ key on a calculator.

1.9 Find each cube root.

$\sqrt[3]{8}$	$\sqrt[3]{125}$	$\sqrt[3]{27}$	$\sqrt[3]{0.001}$	$\sqrt[3]{0.027}$	$\sqrt[3]{216}$	$\sqrt[3]{1000}$	$\sqrt[3]{1\,000\,000}$	$\sqrt[3]{-8}$	$\sqrt[3]{-27}$	$\sqrt[3]{-1000}$	$\sqrt[3]{-1}$

Exercise 1.10 · Further powers and roots (calculator allowed)

1.10 Work out the following. You may use a calculator.

6^4	$3^5 + 2^4$	$(3^4)^2$	$0.1^6 \div 0.01^4$	$\sqrt[4]{2401}$	$\sqrt[8]{256}$
$(\sqrt[5]{243})^3$	$(\sqrt[9]{36})^9$	$2^{-2} \times \sqrt[4]{16}$	(1/64)^(1/6) × 2^7	$\sqrt[4]{(5^4)}$	$(\sqrt[10]{59049})^2$

Exercise 1.11 · Directed numbers

1.11.1 The highest temperature ever recorded was 58 °C in Libya. The lowest was −88 °C in Antarctica. What is the temperature difference? [2]

1.11.2 My bank account has a credit balance of $105. Write my balance as a positive or negative number after each of these transactions, made in order.

Transaction	Balance ($)
rent $140	
car insurance $283	
1 week's salary $230	
food bill $72	
credit transfer $250	

1.11.3 The roof of an apartment block is 130 m above ground level. The car park beneath it is 35 m below ground level. How high is the roof above the floor of the car park? [2]

1.11.4 A submarine is at a depth of 165 m. The ocean floor is 860 m below the surface. How far is the submarine from the ocean floor? [2]

Student assessment 1

A1 State whether each number is rational or irrational.

1.5	√7	0.777...	0.7373...	√121	π

A2 Show that each number is rational by writing it as a fraction or a whole number: 0.625, $\sqrt[3]{27}$ and 0.44. [3]

A3 Find the value of 9^2, 15^2, $(0.2)^2$ and $(0.7)^2$. [4]

A4 Calculate $(3.5)^2$, $(4.1)^2$ and $(0.15)^2$. **[3]**

A5 Without a calculator, find √225, √0.01, √0.81, √(9/25), √(5 4/9) and √(2 23/49). **[6]**

A6 Without a calculator, find 4^3, $(0.1)^3$ and $(2/3)^3$. **[3]**

A7 Without a calculator, find $\sqrt[3]{27}$, $\sqrt[3]{1\ 000\ 000}$ and $\sqrt[3]{(64/125)}$. **[3]**

A8 A bank statement for seven days in October is shown. Complete the missing amounts (a) to (f). **[6]**

Date	Payments ($)	Receipts ($)	Balance ($)
01/10			200
02/10	284		(a)
03/10		175	(b)
04/10	(c)		46
05/10		(d)	120
06/10	163		(e)
07/10		28	(f)

A9 Using a calculator if necessary, work out $2^6 \div 2^8$, $4^5 \times \sqrt[6]{64}$ and $\sqrt[4]{81} \times 4^3$. [3]

Check yourself

1 Explain why 1 is not a prime number, and why 2 is the only even prime. [2]

2 Write 180 and 84 as products of prime factors. Use them to find the HCF and the LCM of 180 and 84. [4]

3 Two lighthouses flash together at midnight. One flashes every 15 seconds and the other every 25 seconds. When do they next flash together? [2]

4 Give an example of two irrational numbers whose product is rational, and two whose sum is irrational. [2]

5 Explain the difference between "the square roots of 49" and "$\sqrt{49}$". [2]

6 At 6 a.m. the temperature is −7 °C. By noon it is 5 °C. By midnight it has fallen 9 °C from the noon value. Find the rise in the morning and the temperature at midnight. [2]

Chapter quiz

Q1 Which of these numbers is irrational?

A	B	C	D
0.25	√2	√9	0.3 recurring

Q2 Which of these is a prime number?

A	B	C	D
1	21	29	39

Q3 What is 72 written as a product of prime factors?

A	B	C	D
$2^3 \times 3^2$	$2^2 \times 3^3$	8 × 9	2 × 36

Q4 What is the highest common factor (HCF) of 12 and 18?

A	B	C	D
2	3	6	36

Q5 What is the lowest common multiple (LCM) of 6 and 10?

A	B	C	D
2	16	30	60

Q6 What is the reciprocal of 2/5?

A	B	C	D
5/2	−2/5	2/5	1/10

Q7 What is $\sqrt[3]{-64}$?

A	B	C	D
−8	−4	4	It has no answer

Q8 At 04:00 it is −3 °C. By 09:00 it has risen by 8 °C. What is the temperature at 09:00?

A	B	C	D
−11 °C	−5 °C	5 °C	11 °C

End of assignment · Check your answers against the chapter at gurujazzy.com/subjects/o-level-mathematics/chapter-1-number-and-language/